"LINCOLN"®

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ALLIED RADIO CORPORATION CHICAGO, ILL. U.S.A.

MODEL L-2000A — CLASS "D" CITIZENS BAND TRANSCEIVER

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INSTRUCTIONS

The "Lincoln" Model L-2000A Transceiver is a combination transmitter and receiver for use in the 11-meter (Class D) Citizen's Radio Service. Designed to meet the Federal Communications Commission (FCC) requirements, the unit will provide economical and reliable radio communication in its intended application if installed and operated in accordance with instructions contained herein.

The transmitter may be operated on any channel in the 11 meter Citizen's Band (1-22). Provision has been made for the insertion of 5 crystals into the unit, any one of which may be selected by means of a 5-position selector switch. Crystals covering any of the 22 channels can very easily be inserted into the unit, but it should be noted that the FCC regulations specifically require that any adjustment made to any frequency-determining component in the transmitter be carried out under the supervision of, or by, a person holding a first or second class radiotelephone operators license.
Crystal controlled and plate modulated, the transmitter delivers the maximum allowable power input of 5 watts to the final RF amplifier.

The receiver utilizes a sensitive superheterodyne circuit with AVC and incorporates a controlled noise limiter. An RF stage precedes the detector for added sensitivity and selectivity and to keep RF radiation to a minimum. The receiver tunes to all 22 channels.

A variable "Pi" network is incorporated that permits matching to any type of antenna.

A 2 position switch is incorporated which operates a remote external speaker for use in an office or plant as a paging communication system.

INPUT SUPPLY

The L-2000A may be operated from a 115 volt 50-60 cycle AC source or from a 6 or 12 volt battery source. Accessory power units are available for use with the transceiver when operated from 6 or 12 volts DC.

115V 50-60 cycle AC Source: An AC line cord, terminated at one end with a normal AC plug and at the other with an 11-pin socket, is supplied with the Transceiver. The 11-pin socket should be connected to the matching plug on the transceiver before inserting the AC plug into the wall outlet.

6V or 12V DC Source: Model L-2706 (6 Volt) and Model L-2712 (12 Volt) Power Units are available as external power supplies for the transceiver when 6 or 12 volt operation is desired. Make certain that the proper power supply is used before connecting to battery power.

INSTALLATION OF ANTENNA

Since the maximum allowable power input to the RF amplifier is fixed at 5 watts, the most important single factor determining optimum transmission is the antenna. The antenna chosen should be selected for each transceiver on the basis of the application involved.

INSTALLATION OF FIXED ANTENNA

For short range communication (1-3 miles) an inexpensive base load type of antenna or spiral whip antenna will be adequate. An antenna of the "ground plane" type will provide greater, more reliable coverage. Both of these types are essentially non-directional and are ideal for applications involving fixed-to-mobile operation.

The directional "beam" type of antenna may be used to extend the range of the Transceiver and will provide reliable communication over an unusually long range or under adverse weather conditions. Because of their directional properties these antennas are ideal for point-to-point communication, that is, from fixed station to another.

The range of the transceiver also has a direct bearing on the height of the antenna used. Regardless of the type chosen, always locate the antenna as high as possible within the legal limits established by the FCC. (The regulations limit the height of the antenna to a maximum of 20 feet above the structure on which the antenna is mounted). It is important therefore, to choose a location for the transceiver that is favorable to your antenna location. A long lead-in cable will introduce a certain amount of power loss and should be avoided where possible unless the antenna location justifies its use. Up to 25 feet of cable lead-in may be used if it permits a favorable antenna Location.

Wherever possible, use a good water pipe ground. In most cases this will provide greatly improved operation.

INSTALLATION OF MOBILE ANTENNA

The type of antenna best suited for mobile service is a vertically polarized whip antenna. In any mobile installation (Cars, trucks, boats, etc.), an antenna system that is non-directional has to be used. Other factors likely to offset performance are lack of a good earth ground and ignition interference. However, the base-loaded type whip antenna will normally provide good results for short-range communications from 1-5 miles. Greater range and more reliable operation can be obtained with a full quarter-wave vertical whip antenna. Both of these types of antennas use the metal body of the vehicle as a "ground plane". If the transceiver is not mounted to any metal surface, it will be necessary to run a separate ground wire from the unit to a good metal ground in the vehicle. If installed in a boat the transceiver will not operate at maximum efficiency without a ground plate, unless your vessel has a steel hull. However, before installing the transceiver, consult a qualified marine technician regarding an adequate grounding system.

ANTENNA TERMINATION

The antenna lead-in cable, RG-58/U, should be terminated with a UHF type PL-259 connector. The receptacle, SO-239, located on the transceiver accepts this type of connector.

When using a base loaded antenna use a 90 degree right-angle plug adapter type M-359 between transceiver receptacle and base loaded antenna.

IGNITION INTERFERENCE

Engine ignition interference in a car or truck should not present a serious problem. The suppression carried out on vehicles equipped with a standard broadcast radio will normally suffice. However, if an ignition interference problem is present, any skilled auto radio repairman should be able to correct it for you.

Electrical noise from engines and other electrical equipment aboard a boat or vessel can render your transceiver useless. The worst offender will be the ignition system of gasoline engine powered boats. Generators on both gasoline and diesel engines, auxiliary generators, electric motors on refrigerators, bilge pumps, fans, etc., must be filtered for quiet radio reception.

Unfortunately, there is no hard and fast rule for the elimination of noise. It is best to attack the problem systematically. The ignition system can be filtered by the use of a "spark shield" made to fit most common gasoline marine engines. These shields are easily installed and can be removed for spark plug and point servicing in less than a minute.

Auxiliary generators are quieted down by condenser installations. Condensers of the highest quality, in metal cans, should be used. We recommend that a capacity of 1.0 mfd be used. These are of greater capacity than the condensers normally used in automobile radio installations. The same condensers can be used to filter the other motors. Condensers are installed at the generator armature terminal or, in extreme cases, directly on each brush holder. The metal can is connected to the generator frame. Never connect a condenser to the field terminal of a generator.

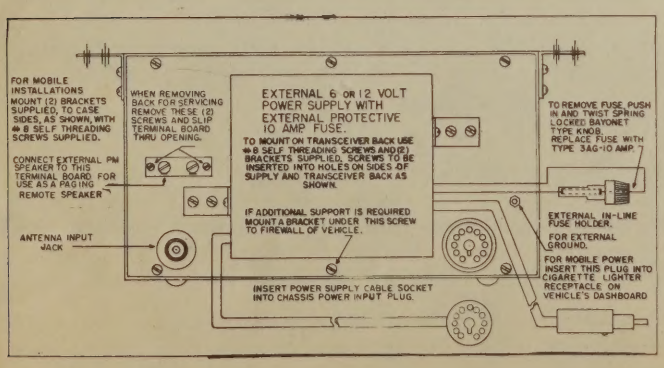
The voltage regulator on the larger generators is frequently a source of troublesome noise. Before attempting any filtering on the regulator, have the unit cleaned and adjusted by an expert. If noise is still present, install condensers on the armature terminal of the regulator. Again, do not put a condenser on the field terminal.

Another, more infrequent source of noise is caused by the rotation of the propeller shaft in its various bearings. This rotation causes static electricity discharge. If noise is present when the vessel or boat is underway but goes away when you throw the engine out of gear, you most probably have "shaft noise". This noise can usually be eliminated by installing phosphor bronze "fingers" in such a way as to allow wiping contact with the shaft. The finger is then connected to the engine block with a heavy wire.

Diesel engines have no ignition system and therefore need no shields. The generators must be filtered just as they are for gasoline engines.

Other electrical accessories such as fans, bilge pumps, electric toilets, fresh water systemmotors, etc., are also a possible source of noise. These units can be noise suppressed by means of condensers.

MOBILE INSTALLATION


FOR MOBILE INSTALLATIONS MOUNT (2) BRACKETS SUPPLIED, TO CASE SIDES, AS SHOWN, WITH #8 SELF THREADING SCREWS SUPPLIED.
WHEN REMOVING BACK FOR SERVICING REMOVE THESE (2) SCREWS AND SLIP TERMINAL BOARD THRU OPENING.
EXTERNAL 6 OR 12 VOLT POWER SUPPLY WITH EXTERNAL PROTECTIVE 10 AMP FUSE.
TO MOUNT ON TRANSCEIVER BACK USE #8 SELF THREADING SCREWS AND (2) BRACKETS SUPPLIED. SCREWS TO BE INSERTED INTO HOLES ON SIDES OF SUPPLY AND TRANSCEIVER BACK AS SHOWN.
TO REMOVE FUSE PUSH IN AND TWIST SPRING LOCKED BAYONET TYPE KNOB. REPLACE FUSE WITH TYPE 3AG-10 AMP.
CONNECT EXTERNAL PM SPEAKER TO THIS TERMINAL BOARD FOR USE AS A PAGING REMOTE SPEAKER
IF ADDITIONAL SUPPORT IS REQUIRED MOUNT A BRACKET UNDER THIS SCREW TO FIREWALL OF VEHICLE.
EXTERNAL IN-LINE FUSE HOLDER.
FOR EXTERNAL GROUND.
ANTENNA INPUT JACK
FOR MOBILE POWER INSERT THIS PLUG INTO CIGARETTE LIGHTER RECEPTACLE ON VEHICLE'S DASHBOARD
INSERT POWER SUPPLY CABLE SOCKET INTO CHASSIS POWER INPUT PLUG.

Before installing the transceiver in a car, truck, boat, etc., be sure to choose a location which is convenient to the operating controls, and will not interfere with the normal functions of the driver. In most installations, the power unit can be mounted directly to the rear of the transceiver by means of 2 mounting brackets and 8 self-threading screws as shown in the illustration. Connect the 11-pin socket at the end of the power cable to the corresponding input plug at the rear of the transceiver.

The transceiver may then be mounted to the underside of the instrument panel or dashboard of a car, truck, etc., by means of the 2 remaining brackets and 8 self-threading screws. A third bracket (not supplied) may be used as shown if additional support is required. If desired, the power unit can be mounted separately, using the two brackets to mount to it directly to the mounting surface. The power unit is equipped with a power input cable terminated with a plug which may be inserted directly into the cigarette lighter socket on a car or truck. A 10 amp fuse is incorporated in the power unit. In a more permanent installation the plug should be removed and the cable connected to main battery source. A convenient place to make this connection would be the ignition switch. In this manner, the power supply to the transceiver will be controlled by the position of the ignition key. This will prevent unauthorized persons from using the transceiver and also prevent the transceiver from being left on. It is imperative that the "hot" or center lead of this plug is connected to the ignition switch. If this wire is reversed, the fuse in the vehicle will blow.

OPERATING INSTRUCTIONS

This transceiver has been designed for use in class "D" operation in the 11 meter citizens radio service. It is designed to meet the Federal Communications Commission rquirements applicable to equipment operating in this service under class "D" emission, and not to be used for any other purpose. Part 19 of the F.C.C. regulations defines operation in this service, and you are required to read and understand these regulations prior to operating this equipment. Copies of Manual VI (covering the FCC regulations for Amateur and Citizen's Band Radio Service) include part 19 and are available for $1.25 from the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C. You are also required to submit a completed copy of FCC Form 505 prior to operating this equipment on the air. YOU WILL BE IN VIOLATION OF PART 19 OF THE REGULATIONS IF YOU OPERATE THIS EQUIPMENT ON THE AIR PRIOR TO RECEIVING YOUR LICENSE AND CALL SIGN.

MAXIMUM POWER TRANSFER TO ANTENNA

With antenna disconnected, insert a #47 Pilot lamp into the antenna receptacle to serve as a dummy antenna. Make sure the center terminal or stud of the Pilot lamp makes contact with the center jack of the antenna receptacle. Connect the outer case of the Pilot lamp to any convenient chassis ground by means of a short lead. Remove plug button located on top of cabinet. Set Transmit-Receive switch to the upper position. With a combination coil slug alignment tool adjust (C1) antenna tank capacitor screw, (Slug type) located beneath plug button opening and slightly to cabinet rear, on chassis, for maximum brilliance of the Pilot lamp. Adjust antenna output capacitor screw (C4), flat ceramic condenser located on bracket near speaker, for maximum lamp brilliance. Repeat the above adjustments until maximum lamp brilliance is obtained.

After the above adjustments have been made, switch the Transmit-Receive switch momentarily to receive, and then back to transmit. If the lamp does not light or lamp brilliance is reduced, adjust the crystal oscillator coil slug screw, located beneath plug opening, for maximum brilliance of the #47 Pilot lamp. Repeat adjustments.

NOTE: For location of trimmer screws see license label.

CONTROL DESCRIPTION

VOLUME CONTROL AND POWER SWITCH: When the control is in the extreme counter-clockwise position, the power is "off". From this position, a slight clockwise rotation will turn the power "on". Almost, instantly the "crystal" indicator will light. Further rotation in this direction, speaker volume may be increased to any degree until the full output of the receiver is obtained. Allow a few moments for the tubes to warm up.

TUNING CONTROL: Tuning is accomplished in the same manner, as when using a standard broadcast band radio. Note: Receiver tuning has no effect on the frequency of transmission. The small outer knob is the tuning control knob which operated the large outer pointer knob and tuning condenser through a reduction drive to insure ease and accuracy in the selection of stations.

TRANSMIT-RECEIVE SWITCH — Normal position is in REC, placing the receiver section in operation. The lower TRANSMIT position permits short transmissions of an intermittent nature. When released, the control will return to the REC position automatically. The upper TRANSMIT position permits continuous transmission for longer periods of time, without applying continuous pressure to the control. Both TRANSMIT positions perform the same basic functions.

CRYSTAL SELECTOR SWITCH — Selects any one of 5 channels (if 5 crystals have been inserted). As a consequence of its design, this equipment normally requires no adjustment or retuning of the transmitter section when switching from one channel to another. The transmitter may be operated with only one crystal installed, provided the selector switch is set to the position which places it in circuit (normally position A). Crystals for any channel in the band may be installed provided that they are within .005% accuracy, and they are of the 3rd overtone type.

A list of channels and their respective frequencies are provided below.

PAGING SWITCH

Normal position is in "OFF", placing transceiver in normal operation. For use as a Paging System, switch is to be in "ON" position. External speaker must be connected to marked terminal board located on rear back. For indoor installations, ordinary plastic covered lamp cord can be used to connect external speaker to Transceiver, and may be extended as far as 100 ft. without any significant power loss. TV antenna lead may be used for shorter distances.

Set the Transmit-Receive control to the lower transmit position and speak in a normal tone of voice into the microphone. Release the Transmit control at the completion of your conversation. Return Paging switch button to "OFF" position.

CLASS-D CITIZEN'S BAND CHANNELS AND FREQUENCIES

CHANNEL	MC	CHANNEL	MC
1	26.965	12	27.105
2	26.975	13	27.115
3	26.985	14	27.125
4	27.005	15	27.135
5	27.015	16	27.155
6	27.025	17	27.165
7	27.035	18	27.175
8	27.055	19	27.185
9	27.065	20	27.205
10	27.075	21	27.215
11	27.085	22	27.225

NOISE LIMITER — is used to reduce excessive noise (such as that caused by auto ignition or other disturbances) in those cases where this characteristic type noise is greater in intensity than the received signal. The use of this control may reduce slightly the overall sensitivity of the receiver.

TRANSMITTING

Be sure that the power supply for the transceiver has been connected as discussed previously, and that the unit has an adequate ground (if not mounted to a metal surface). One of the antenna systems discussed earlier should be connected. Plug the microphone into the jack provided on the extreme left of the front panel.

1. Turn the Transceiver on, and set the TUNING control to the channel on which you wish to operate. The crystal indicator lamp will light if power has been applied to the unit.
2. Set the CRYSTAL SELECTOR to the required position for transmission on the desired channel.
3. Set the PAGING SWITCH to the "OFF" position.
4. Set the TRANSMIT-RECEIVE control to the lower transmit position. The RF indicator lamp will light, indicating the presence of RF in the transmitter section. Hold the microphone 4 to 8 inches away and speak in a normal tone of voice. Shouting will not increase the strength of your signal. Speak clearly and slower than you would normally.

   As you speak into the microphone you will notice that the RF indicator will "flicker", giving an indication that the speech amplifier and modulator circuits are operating properly. Release the transmit control at the completion of your message. Use the fine tuning control (small outer knob) to tune in the answering station if necessary.

OPERATING DATA

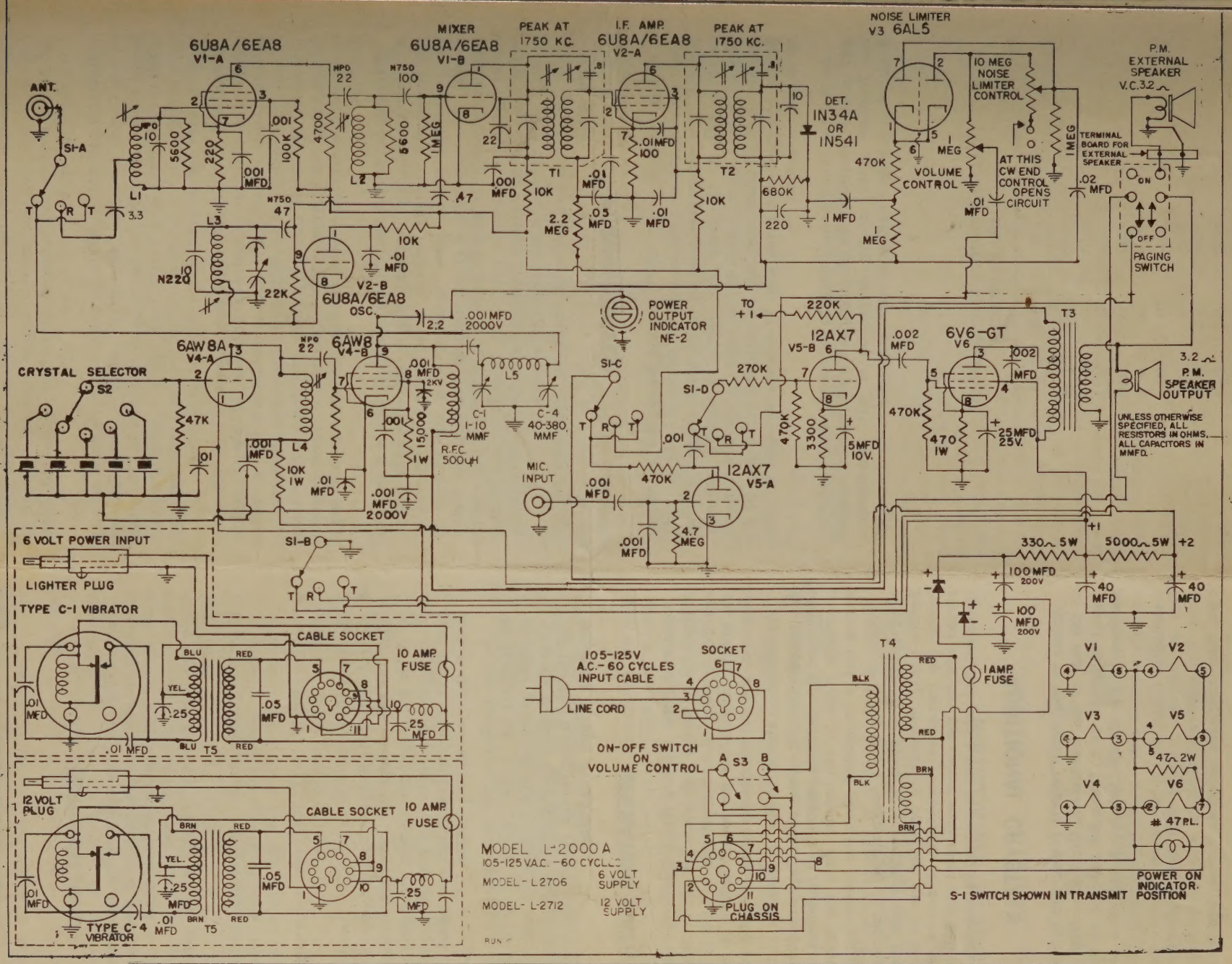
Remember, the Citizens Radio Service is not similar to the Amateur Radio Service with respect to permissible communications and that amateur type communications such as calling CQ, working distant stations for the fun of talking to someone that far away, etc., are not permissible under any circumstances.

Transmissions should be brief as possible and only made after due consideration for others using the same channel. You should remember too, that the person who is transmitting cannot hear comments made by the listener since the receiver at the transmitting end is inoperative when the transmitter is being used.

Finally, it is the user's responsibility to see that his equipment is operating at all times in accordance with the Citizen's Radio Service rules. Off-frequency operation can be guarded against by having the transceiver checked by a service engineer or other person who has the proper equipment and skill required to use it (provided they hold a first or second class radiotelephone license).

ADDITIONAL CRYSTALS

Access to the crystal holders is obtained by removing the back on the rear of the transceiver. Numbering from left to right are crystal holders 1 to 5. These are selected by the corresponding positions of the Crystal Selector Switch. The Model L-2000A is normally supplied with a crystal for channel 9 (27-065 MC) already installed in holder No. 1. Additional Crystals for other channels may be inserted, provided that their installation is carried out under the supervision of, or by a person holding a first or second class radio telephone operators license. See license label.



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